IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of Roger E. Frech et al.
Serial No. 10/038,782
Filed December 31, 2001
Confirmation No. 4101

Group Art Unit 1745

For CONDUCTIVE POLYAMINE-BASED ELECTROLYTE

Examiner Gregg Cantelmo

July 26, 2006

DECLARATION OF DANIEL T. GLATZHOFER
UNDER 37 C.F.R. §1.132

TO THE COMMISSIONER OF PATENTS,
SIR:

I, Daniel T. Glatzhofer, hereby declare and state as follows:

1. I am a co-inventor of the subject matter claimed in the above-referenced patent application.

2. I currently am, and have been for the past 18 years, a Professor of Chemistry and Biochemistry at the University of Oklahoma. I received a Ph. D. in Chemistry and Macromolecular Science & Engineering (1984) from The University of Michigan (Ann Arbor, MI); an M.S. in Macromolecular Science & Engineering (1982) from the University of Michigan; and a B.S. in Chemistry (1979) from Denison University (Granville, Ohio). An abridged copy of my vitae is attached.

3. I have conducted extensive research on the subject matter of the present invention. In my work, I rely not only upon my own research and experience, but also on the results of research and development by other around the world published in

scientific journals, as well as in the specifications of patents and published patent applications. I assess such published work by others for myself, and if I consider it to be sound and relevant, use in as a basis of knowledge and assistance in my own work.

4. I consulted with Applicants' attorneys regarding the prior art references cited by the Office against the present application in the actions of (a) October 20, 2003, (b) November 3, 2004, (c) June 6, 2005, and (d) January 26, 2006. The responses filed by Applicants' attorneys were and are based, in part, on my analysis of those references.

5. I have analyzed the information provided by the Office as anticipating the claimed subject matter (i.e., the Derwent Abstract of JP 62-140306, hereinafter JP '306). It is my opinion that the pending claims (i.e., those claims pending in view of Applicants' Amendment C, being filed simultaneously herewith) are novel over this reference.

6. JP '306 discloses a solid electrolyte composition that comprises (a) a cross-linked polymer prepared by cross-linking branched polytheyleneimine with a poly-functional epoxy compound, and (b) an inorganic electrolyte. The resulting cross-linked polymer is said to preferably contain primary, secondary and tertiary amine groups in a ratio of 1:2:1. The epoxy compound is preferably a diepoxyalkane (e.g., 1,3-diepoxybutane or 1,7-diepoxyoctane), an epoxy resin of the polyalkylene glycol type (e.g., epoxy resin of bisphenol A or F type), a novolak epoxy resin or polyfunctional phenol type, a diglycidyl ether compound prepared by reacting resorcinol and epihalohydrin, an aralkyl epoxy resin or an epoxy resin of hydantoin type. The inorganic electrolyte is preferably $LiClO_4$, LiI, $LiBF_4$, $LiAsF_6$, $LiCF_3SO_3$, $LiPF_6$, LiSCN, NaI, NaSCN, NaBr, CsSCN, $AgNO_3$, $CuCl_2$, or $Mg(ClO_4)_2$. The composition is prepared by blending uniformly the imine and the inorganic electrolyte, and then

cross-linking the polyethyleneimine by adding the mixture with the epoxy compound. The mixture may optionally be heated in the presence of a solvent (e.g., methanol). When the composition is formed into a sheet, etc., the composition is formed prior to the termination of the cross-linking reaction.

7. The cross-linked polymer electrolyte prepared in JP '306 is not inert to lithium metal; rather, this cross-linked polymer is reduced by lithium metal. This is because primary or secondary amine moieties react with a poly-functional epoxy cross-linker (e.g. a diepoxide cross-linker) to form secondary and tertiary amine moieties, respectively, having β-hydroxyamine groups thereon. These β-hydroxyamine groups will react with metallic lithium, thus being reduced to form lithium alkoxides. The formation of these alkoxides is undesirable, as they lead to the formation of a passivation layer on the surface of the electrochemical cell, of which the electrolyte is a part. Although these β-hydroxyamine groups could, in principle, be chemically modified in order to prevent this reaction with metallic lithium, the above-noted details of JP '306 do not reference such a chemical modification step of any kind, for any purpose.

8. The resulting cross-linked polymer electrolyte prepared in JP '306 is also not inherently protonated, and thus does not contain labile protons in the absence of a protic solvent. This is because the hydrogen atoms that are part of the β-hydroxyamine groups are not sufficiently acidic to have labile protons inherently present in the polymer electrolyte.

9. The cross-linked polymer electrolyte prepared in JP '306 also does not contain an ion pair, wherein one member of the pair is covalently attached to the polymer backbone and the other is capable of diffusing through the polymer electrolyte upon the application of an electrical field. Rather, the electrolyte of JP '306

is of a conventional nature, wherein both the cationic and anionic species present therein, resulting from the introduction of the inorganic electrolyte (i.e., one of the metal salts referenced therein), diffuse through the polymer electrolyte when an electrical field is applied thereto.

10. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-referenced application or any patent issuing thereon.

July 26, 2006
Date

Daniel T. Glatzhofer

Daniel Thomas Glatzhofer
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Norman, Oklahoma 73072

Academic:
Ph.D. Chemistry and Macromolecular Science & Engineering (1984), The University of Michigan
M.S. Macromolecular Science & Engineering (1982), The University of Michigan (Ann Arbor)
B.S. Chemistry (1979), Denison University (Granville, Ohio).

Research and Employment Experience:
Professor (2005-present), Associate Professor (1994-2005), Assistant Professor (1988-94), Dept of Chemistry and Biochemistry, The University of Oklahoma. Organic and Polymer Chemistry. Synthesis and electronic properties of polymers, polymer electrochemistry, organometallic polymers, cyclophane and metal arene chemistry.

Postdoctoral Research (1987-88), The Ohio State University (Columbus, Ohio) and E.I. du Pont de Nemours and Co. (Wilmington, Delaware) with Prof. A. J. Epstein (Physics, OSU) and Dr. J. S. Miller (du Pont). Development and evaluation of new organic and organometallic molecular and polymeric materials with novel ferromagnetic properties, especially polymers containing stable free radical monomer units.

Postdoctoral Research (1984-86), The Max-Planck-Institute for Polymer Science, Universität Mainz, West Germany, with the group of Prof. G. Wegner. Electrochemical synthesis and evaluation of conducting polymers (mainly polypyrrole salts), with an emphasis on developing systems for investigating the influence of synthetically induced morphological features on charge carrier transport.

Ph.D. Thesis Research (1980-84), The University of Michigan, "Cyclopolymerization of Unsaturated Paracyclophanes: Electrically Conducting Polymers", Prof. D. T. Longone, Advisor. Synthesis of polymers containing bridged aromatic rings in their backbones and evaluation of their thermal and electronic (esp. optical, flourescence, ESR and conductivity) properties.

Internship (Summer 1979 and 1980), Owens-Corning Fiberglas (Granville, Ohio), Exploratory Research Division, Dr. A. Marzocchi, supervisor. Cationic grafting of elastomers onto natural materials and subsequent materials evaluation; elastomer modified emulsions; thermosetting composites.

Internship (Summer 1978), Diamond Shamrock Corp. (Painesville, Ohio), Analytical Chemistry Dept. (General "wet" chemical analysis with emphasis on atomic absorption and compounded polymer analysis).

Undergraduate Thesis Research (1977-79), Denison University, Prof. R. R. Doyle, Advisor. Novel amino acid synthesis and characterization of poly(p-phenylene) and poly(p-phenylene sulfide).

Honors, Awards and Scholarships:
University of Oklahoma – President's Associates Presidential Professorship 2004 - 2008
University of Oklahoma – Kinney-Suggs Award for Outstanding Professor in the College of Arts and Sciences 2002
University of Oklahoma – Regents' Award for Superior Teaching 2001
University of Oklahoma - Amoco Teaching Award 1996.
University of Oklahoma – Junior Faculty Research Fellowship1989.
Max-Planck-Society Fellow (1984-86), West Germany.
3M and Monsanto Fellowships in Macromolecular Science and Engineering; DOW Chemical Company Foundation Fellow (1980-84), The University of Michigan.
Hugh Galt Research Scholar (1977-79), Denison University.
American Institute of Chemists Undergraduate Award (1979).
Ebaugh Award in Chemistry (1979), Denison University.
American Chemical Society Undergraduate Award (Analytical) (1978).
National Science Foundation Summer Honors Program in Macromolecular Science (1977) at Case

Western Reserve University (Cleveland, Ohio).

Related Experience:
Consultant for E. I. du Pont de Nemours and Co., Central Research and Development (1988 - 1998)

Book Reviewer for the Journal of the American Chemical Society and Jones and Bartlett Publishers.

Journal Reviewer: J. of the American Chemical Society, J. of the American Oil Chemists' Society, J. of Chemical Education, J. of the Electrochemical Society, J. of Molecular Catalysis, J. of Organometallic Chemistry, J. of Organometallic Chemistry, J. of Polymer Science, Langmuir, Macromolecules, Organic Letters, Organometallics, Proceedings of the Oklahoma Academy of Science, Molecular Crystals and Liquid Crystals, Solid State Ionics, Synthetic Metals.

Research Proposal Reviewer: American Chemical Society, National Science Foundation, Department of Energy, Research Corporation, ACS Petroleum Research Fund

Research Supervision - Responsible for setting up research laboratories for Electrochemical Synthesis and Synthetic Organic & Polymer Chemistry at The Max-Planck-Institute for Polymer Science and E.I. du Pont de Nemours and Co. Assisted in the supervision of Undergraduate Research at the University of Michigan, Graduate Research at the Max-Planck-Institute for Polymer Science and supervised the research of a technician at E.I. du Pont de Nemours and Co.

Teaching Assistant - Organic Chemistry Laboratory, The University of Michigan (1979-81) and Denison University (1978-79), Organic Chemistry Discussion Section, The University of Michigan (1979-80).

Chemistry Librarian at Denison University (1978-79).

Professional Memberships
The American Chemical Society
Sigma Xi - National Research Honorary (Non-active)

Personal and Miscellaneous Information:
Birthdate: June 20, 1957.
Conversational in German, some Spanish.

Lectures and Presentations (from 129 total, only shown since 2000, *denotes presentor):
129) “Proton Conducting Polymer Electrolyte Membranes Based on Linear Poly(ethylenimine)", Electrochemical Society Meeting , Denver, CO, (May2006), with Frank Yepez Castillo*, Guinevere A. Giffin and Roger Frech

128) “Spectroscopic Investigation of Cross-linked Poly(ethylenimine) Hydrochloride as a Proton Conducting Membrane", Electrochemical Society Meeting , Denver, CO, (May2006), with Guinevere A. Giffin*, Frank Yepez Castillo, and Roger Frech

127) “Formation of Biaryls from N-Aromatic Amides via Nitrosamide Intermediates”, American Chemical Society National Meeting – Atlanta, Ga,. (April 2006), with Zhe Jiang*.

126) “A Novel Ferrocene-modified Poly(ethylenimine) Redox Polymer for Biosensor Applications”, American Institue of Chemical Engineering National Meeting, Cincinatti, OH (November 2005), with David Schmidtke* and Steven Merchant.

125) "A Radically Crosslinked PEO/PEI Hybrid Polymer Electrolyte Host, Linear Poly(N-allyethylenimine-co-N-(2-(2-methoxyethoxy)ethyl)ethylenimine)", ACS Southwest/Southeast Joint Regional Meeting – Polymer Session, Memphis, TN, (November 2005), with Lieyu (Richard) Hu* and Roger Frech.

124) "Proton Conducting Polymer Electrolyte Membranes Based on Linear Poly(ethylenimine)", ACS

Southwest/Southeast Joint Regional Meeting – Polymer Poster Session, Memphis, TN, (November 2005), with Frank Yepez Castillo*.

123) “Glucose Sensors Based on A Novel Ferrocene-modified Poly(ethylenimine) Redox Polymer”, BMES Baltimore, MD (September 2005), with David Schmidtke* and Steven Merchant.

122) “Polymer Electrolytes Based on Cross-Linked Linear Poly(Ethylenimine) Hydrochloride/Phosphoric Acid Systems”, ACS Polymer Division “Advances in Materials for Proton Exchange Membrane Fuel Cell Systems 2005 – Poster Session, Pacific Grove, CA, (February 2005), with Michael J. Erickson*, Roger Frech and Frank Yepez .

121) “New Polymer Systems for Advanced Battery and Fuel Cell Applications”, University of Southern Mississippi, Hattiesburg, MS (January 2005), invited seminar.

120) “New Polymer Systems for Advanced Battery and Fuel Cell Applications”, Harding University, Searcy, AK (October 2004), invited seminar.

119) "NMR Structural Studies of an Unexpected Product from Reaction of 2-Ethyloxazoline with 2,4-pentanedione", ACS Southwest Regional Meeting – Undergraduate Poster Session, Ft. Worth, TX, (October 2004), with Caitlin E. Porterfield*, Susan L. Alguindigue, Kimberly R. Swinehart, and Francis J. Schmitz.

118) "Ring Opening Reaction of 2-Ethyloxazoline with Aldehydes: a Mechanistic Study", ACS Southwest Regional Meeting – General Poster Session, Ft. Worth, TX, (October 2004), with Zhe Jiang*.

117) "Comparison of Poly(propylenimine) (PPI) to Poly(ethylenimine) (PEI) as a Polymer Electrolyte", ACS Southwest Regional Meeting – General Session, Ft. Worth, TX, (October 2004), with Lieyu (Richard) Hu*, Rachel Mason, and Roger Frech.

116) "Comparison of Lithium Trifluoromethanesulfonate Complexes of Poly(N-methylpropylenimine) to Poly(N-methylethylenimine)", ACS Southwest Regional Meeting – General Poster Session, Ft. Worth, TX, (October 2004), with Rachel Mason*, Lieyu (Richard) Hu and Roger Frech,

115) "Polymer Electrolytes Derived from Poly(N-methylethylenimine) and Poly(N-ethylethylenimine)", ACS Southwest Regional Meeting – General Poster Session, Ft. Worth, TX, (October 2004), with Guinevere A. Giffin*, Roger Frech, Frank Yepez Castillo, and Jördis Eisenblätter.

114) “Polymer Electrolytes Based on Cross-Linked Linear Poly(Ethylenimine) Hydrochloride/Phosphoric Acid Systems”, ACS Southwest Regional Meeting – GeneralSession, Ft. Worth, TX, (October 2004), with Michael J. Erickson*, Roger Frech and Frank Yepez Castillo.

113) "Polymer Electrolytes Derived from Poly(N-methylethylenimine) and Poly(N-ethylethylenimine)", International Symposium on Polymer Electrolytes IX – Mragowo, Poland, (August 2004), with Guinevere A. Giffin*, Roger Frech, Frank Yepez Castillo, and Jördis Eisenblätter.

112) “Polymer Electrolytes Based on Cross-linked Linear Poly(ethylenimine) Hydrochloride/Phosphoric Acid Systems”, 12th Solid State Proton Conductor Conference – Poster Session, Uppsala, Sweden (August 2004), with M. Erickson, R. Frech, F. Yepez Castillo and J. Furneaux*.

111) “Ring Opening Reactions of 2-Ethyl-5,6-dihydro-4H-1,3-oxazine”, ACS Southwest Regional Meeting – Organic Chemistry Session, Oklahoma City, OK, (October 2003), with Richard (Lieyu) Hu and Kimberly R. Swinehart*, and Susan Alguindigue..

110) “Synthesis and Spectroscopic Study of Poly(propylenimine) and its Complexes withLithium Tfiflate”, ACS Southwest Regional Meeting – Organic Chemistry Session, Oklahoma City, OK, (October 2003), with Rachel Mason*, Richard (Lieyu) Hu* and Roger Frech.

109) “Ionic Conductivity and Speciation in Crosslinked Poly(ethylenime)/Tetraethylene glycol diacrylate Gel Electrolytes”, ACS Southwest Regional Meeting – Organic Chemistry Session, Oklahoma City, OK, (October 2003), with Michael Erickson* and Roger Frech.

108) “Mechanism of disordering in lithium salt complexes of poly(ethylenimine)”, American Chemical Society National Meeting – New Orleans, La,. (April 2003), with Morgen Buckner*, Shawna S. York and R.Frech.

107) “N,N,N’, N”,N”-Pentamethyldiethylenetriamine (PMDETA) as a Model Compound for Linear Poly(N-methylethylenimine)”, American Chemical Society National Meeting – New Orleans, La,. (April 2003), with Rebecca A. Sanders*, Scott Boesch, Albert G. Snow, Richard Hu, Roger Frech, and Ralph Wheeler.

106) "Selective Nitration of Aromatic Tosylsulfonamides by Nitrite", ACS Southwest Regional Meeting – Organic Chemistry Session, Austin, Tx, (November 2002), with Kimberly R. Swinehart*.

105) " Decomposition of N-Aromatic N-nitrosamides: Alternatives to Sandmeyer and Suzuki Chemistry", ACS Southwest Regional Meeting – Organic Chemistry Session, Austin, Tx, (November 2002), with Raymond R. Roy and Zhe Jiang.

104) "Simple Conversion of N-Aromatic Amides to Aromatic Halides *via* Nitrosamide Intermediates: Alternatives to Sandmeyer Chemistry", American Chemical Society National Meeting – Organic Division, Boston, Mass. (August 2002), with Raymond R. Roy* and Rodney Smart.

103) "A Spectroscopic and Conductivity Comparison Study of Linear Poly(N-methylethylenimine) with Lithium Triflate and Sodium Triflate", International Symposium on Polymer Electrolytes VIII – Santa Fe, NM, (May 2002), with Albert G. Snow, Rebecca Sanders* and Roger Frech.

102) "Synthesis and Spectroscopic Studes of Linear Poly(N-2-(2-methoxyethoxy)ethyl)ethylenimine), A PEI/PEO Hybrid, and It’s Interactions with Lithium Triflate", International Symposium on Polymer Electrolytes VIII – Santa Fe, NM, (May 2002), with Albert G. Snow*, Rebecca Sanders and Roger Frech.

101) "Solid Polymer/Salt Electrolytes Based on Linear Poly((N-2-cyanoethyl)ethylenimine)", International Symposium on Polymer Electrolytes VIII – Santa Fe, NM, (May 2002), with Michael Erickson* and Roger Frech.

100) "Solid Polymer Electrolytes for Advanced Battery Applications", University of Texas - Dallas, Richardson, TX (March 20, 2002), invited seminar.

99) "Solid Polymer Electrolytes for Advanced Battery Applications", East Central Oklahoma State University, Ada, OK (November, 2001), invited seminar.

98) "A Spectroscopic Study of Lithium Triflate in Tetramethylethylenediamine)", ACS Southwest Regional Meeting – Physical Chemistry Session, San Antonio, Tx, (October 2001), with Rebecca A. Sanders*, Roger E. Frech, and Albert G. Snow.

97) "Vibrational Spectroscopic Studies of Ionic Speciation of Lithium Triflate in Linear Poly(N-methylethylenimine)", ACS Southwest Regional Meeting - Polymer Poster Session, San Antonio, Tx, (October 2001), with Albert G. Snow *, Shawna York, Rebecca Sanders, and Roger E. Frech.

96) "Vibrational Spectroscopic Study of Solid Poly((N-2-cyanoethyl)ethyleneimine)/Salt Electrolytes", ACS Southwest Regional Meeting - Polymer Poster Session, San Antonio, Tx, (October 2001), with Michael Erickson * and Roger E. Frech.

95) "Solid Polymer/Salt Electrolytes Based on Poly(allylamine)", ACS Southwest Regional Meeting - Polymer Poster Session, San Antonio, Tx, (Octoberr 2001), with Lieyu (Richard) Hu * and Roger E. Frech.

94) "Nitration of Aromatic Tosylsulfonamides by Nitrite", ACS Southwest Regional Meeting - Organic Poster Session, San Antonio, Tx, (October 2001), with Kimberly R. Swinehart *.

93) "Simple Conversion of Aromatic Amides to Biphenyls and Aromatic Halides *via* Nitrosamide Intermediates: Alternatives to Sandmeyer Chemistry", ACS Southwest Regional Meeting - Organic Poster Session, San Antonio, Tx, (October 2001), with Raymond Roy *.

92) "Simple Conversion of Aromatic Amines and Amides to Esters and Phenols*via* Nitrosamide Intermediates", ACS Southeast/Southwest Regional Meeting - Organic Section, New Orleans, La, (December 2000), with Raymond Roy *and Kim Cossey.

91) "Structure and Conductivity of Linear Poly(ethylenime)-Lithium Triflate Systems", ACS Southeast/Southwest Regional Meeting - Polymer Poster Section, New Orleans, La, (December 2000), with A. G. Snow, * S. York and R. Frech.

90) "Condensation Polymerization of 1,1,3,3-Tetramethoxypropane and 1,2-Diaminoethane", ACS Southeast/Southwest Regional Meeting - Polymer Poster Section, New Orleans, La, (December 2000), with A. G. Snow,* J. Jang, R. Gutierrez and G. Cho.

89) "A Comparative Vibrational Spectroscopic Study of Lithium Triflate and Sodium Triflate in Linear Poly(ethylenimine)", International Symposium on Polymer Electrolytes VII, Sydney, Australia, (August 2000), with S. York, R. Frech*, and A. Snow.

88) "A Vibrational Spectroscopic Study of Lithium Triflate in Linear Poly(ethylenimine) and Dimethylethylenediamine", Oklahoma Pentasectional Meeting, Tulsa, OK, (April 2000), with S. York*, R. Frech, and A Snow.

Publications:

M. Erickson and D. T. Glatzhofer, "**Room Temperature Fuel Cells Based on Phosphoric Acid/Crosslinked Poly(ethylenimine) Membrane**s", manuscript in preparation.

R. A. Sanders, S. E. Boesch, A. G. Snow, L. Hu, R. Frech*, R. A. Wheeler, and D. T. Glatzhofer, "**Spectroscopic Investigation of Linear Poly(N-methylethylenime), LPMEI, using a Model Compound: N,N,N',N',N''-Pentamethyldiethylenetriamine (PMDETA) with Lithim Triflate ($LiCF_3SO_3$) and Sodium Triflate ($NaCF_3SO_3$)**", *manuscript in preparation*.

S. A. Merchant, D. T. Glatzhofer, and D. W. Schmidtke, "**A Novel Ferrocene-modified Poly(ethylenimine) Redox Polymer for Biosensor Applications**", submitted for publication to *J. Phys. Chem.*.

L. Hu, D. T. Glatzhofer, R. Mason and R. Frech, "**Linear Poly(propylenimine)/Lithium Triflate as a Polymer Electrolyte**", submitted for publication to *Solid State Ionics* .

58) L. Hu, D. T. Glatzhofer, and R. Frech, **"Radically Crosslinked Branched Poly(N-allylethylenimine) with Lithium Triflate As a Solid State Polymer Electrolyte"**, *Polymer* ., 47, 2099-2105 (2006).

*57) D. T. Glatzhofer, M. J. Erickson, R. Frech, F. Yepez, and J. Furneaux, "**Polymer Electrolytes Based on Cross-Linked Linear Poly(Ethylenimine) Hydrochloride/Phosphoric Acid Systems**", *Solid State Ionics*, **176**, 2861 – 2865 (2005).

*56) R. Frech, G. A. Giffin, F. Yepez Castillo, D. T. Glatzhofer, and J. Eisenblätter "**Spectroscopic Studies of Polymer Electrolytes Based on Linear Poly(N-methylethylenimine) and Poly(N-ethylethylenimine)**", *Electrochimica Acta* , **50**, 3963 – 3968 (2005).

55) M. Erickson, D. T. Glatzhofer, and R. Frech, "**Gel electrolytes based on crosslinked tetraethylene glycol diacrylate/poly(ethylenimine) systems"**, *Polymer*, **45**, 3389-3397 (2004).

54) Buckner, Morgen; York, Shawna S.; Frech, Roger; Glatzhofer, Daniel T. "**The mechanism of disordering in lithium salt complexes of poly(ethylenimine)"**, *Polymer Preprints*, **44**(1), 1085-1086 (2003).
53) R. A. Sanders, S. E. Boesch, A. G. Snow, L. Hu, R. Frech, R. A. Wheeler, and D. T. Glatzhofer, "**N,N,N',N',N"-Pentamethyldiethylenetriamine (PMDETA) as a Model Compound for Linear Poly(methylethylenimine), LPMEI**", *Polymer Preprints,* **44**(1), 966-967 (2003).

52) M. Erickson, D. T. Glatzhofer, and R. Frech, "**Solid Polymer/Salt Electrolytes Based on Linear Poly((N-2-cyanoethyl)ethylenimine)"**, *Electrochimica Acta* , **48**, 2059–2063 (2003).
51) R. A. Sanders, A. G. Snow, R. Frech, and D. T. Glatzhofer, "**A Spectroscopic and Conductivity Comparison Study of Linear Poly(N-methylethylenimine) with Lithium Triflate and Sodium Triflate**", *Electrochimica Acta* , **48**, 2247–2253 (2003).
.
50) A. G. Snow, R. A. Sanders, R. Frech, and D. T. Glatzhofer "**Synthesis and Spectroscopic Studes of Linear Poly(N-2-(2-methoxyethoxy)ethyl)ethylenimine), A PEI/PEO Hybrid, and It's Interactions with Lithium Triflate**", *Electrochimica Acta* , **48**, 2065–2069 (2003).

49) D. T. Glatzhofer, R. R. Roy and K. N. Cossey, "**Conversion of N-Aromatic Amides to O-Aromatic Esters**", *Organic Letters*, **4**, 2349-2352 (2002).

48) W-L. Yuon, E. A. O'Rear, B. P. Grady, and D. T. Glatzhofer, **"Nanometer-Thick Poly(pyrrole) Films Formed by Admicellar Polymerization under Conditions of Depleting Adsolubilization"**, *Langmuir,* **18**, 3343– 3351 (2002).

47) K. A. Coplin, A. L. Habakuk and D. T. Glatzhofer, **"Photoexitation of Poly(p-phenylene sulfoxide): Signatures of Triplet Excitons** *Synth. Met.*, **124**, 271-274 (2001).

46) J. S. Miller, D. T. Glatzhofer, C. Vazquez, R. S. McLean, J. C. Calabrese, W. J. Marshall, J. W. Raebiger, **Electron-Transfer Salts of 1,2,3,4,5-Pentamethylferrocenium, FeII(C5Me5)(C5H5).Structure and Magnetic Properties of Two 1:1 and Two 2:3 Fe(C5Me5)(C5H5) Electron-Transfer Salts of [TCNE].-**, *Inorg. Chem.* **40**, 2058-2064 (2001).

45) W.-L. Yuan, E. A. O'Rear, G. Cho, G. P. Funkhouser, and D. T. Glatzhofer, **"Thin Polypyrrole Films Formed on Mica and Alumina with and without Surfactant Present: Characterization by Scanning Probe and Optical Spectroscopy"**, *Thin Solid Films.* , **385**, 96–108 (2001).

44) S. York, R. Frech, A. Snow and D. Glatzhofer, **"A Comparative Vibrational Spectroscopic Study of Lithium Triflate and Sodium Triflate in Linear Poly(ethylenimine)"**, *Electrochimica Acta* , **46**, 1533–1537 (2001).

43) G. Cho, B. M. Fung, D. T. Glatzhofer, J.-S. Lee, and Y-G. Shul, **"Preparation and Characterization of Polypyrrole-Coated Nano-Sized Novel Ceramic"**, *Langmuir,* **17**, 456– 461 (2001).

42) D. S. Masterson and D. T. Glatzhofer, **"Catalytic Enantioselective Cyclopropanation of Styrene Derivatives Using N-(2',4'-Di-tert-butyl)salicyliden-4-amino[2.2]para-cyclophane as an Asymmetric Ligand"**, *Journal of Molecular Catalysis A*, **161**, 65-68 (2000).

41) G. Cho, D. T. Glatzhofer, B. M. Fung, W. L. Yuon and E. A. O'Rear, **"Formation of Ultrathin Polypyrrole (PPY) Films on Alumina Particles Using Adsorbed Hexanoic Acid as a Template"**, *Langmuir,* **16**, 4424 - 4429 (2000).

40) D. S. Masterson, C. M. Tratz, B. A. Behrens, and D. T. Glatzhofer, **"Hydrogenation of Iron(II) Cationic Complexes of Naphthalene and Methyl-Substituted Naphthalenes"**, *Organometallics*, **19**, 244-249 (2000).

39) D. S. Masterson, T. L. Hobbs, and D. T. Glatzhofer, **"Catalytic Enantioselective Cyclopropanation of Olefins Using N-Salicyliden-4-amino[2.2]paracyclophane as an Asymmetric Ligand"**, *Journal of Molecular Catalysis A*, **145**, 75 (1999).

38) G. Cho, D. T. Glatzhofer, B. M. Fung, W. L. Yuon and E. A. O'Rear, **"Preparation of Ultra-thin Zeolite Films Through a Simple Self-assembled Process"**, *Advanced Materials*, **11**, 497 (1999).

37) G. Cho, J. Jang, I. Moon, J.-S. Lee and D. T. Glatzhofer, **"Enhanced Adhesion of Polypyrrole Film Through a Novel Grafting Method"**, *Journal of Materials Chemistry*, **9**, 345 (1999).
36) S. E. Walden and D. T. Glatzhofer, **"Reply to Comment on Distinctive Normal Harmonic Vibrations of [2.2]Paracyclophane"**, *Journal of Physical Chemistry A*., **103**, 1162 (1999).

35) W. B. Genetti, W. L. Yuan, B. P. Grady, E. A. O'Rear, C. L. Lai and D. T. Glatzhofer, **"Polymer Matrix Composites: Conductivity Enhancement Through Polypyrrole Coating of Nickel Flake"**, *Journal of Materials Science*, **33**, 3085 (1998).

34) D. T. Glatzhofer and M. C. Morvant, **"Substituent Effects on the Electrochemical Oxidation of N, N', N"- Triphenyl-1,3,5-triaminobenzenes"**, *Journal of Physical Organic Chemistry*, **11**, 731 (1998)

33) S. E. Walden and D. T. Glatzhofer, **"Distinctive Normal Harmonic Vibrations of [2.2]Paracyclophane"**, *Journal of Physical Chemistry A*, **101**, 8233 (1997).

32) C. J. Neef, D. T. Glatzhofer, and K. M. Nicholas, **"Cyclopolymerization of 3-Pheny[5]ferrocenophane-1,5-diene: Synthesis and Electronic Properties of a Poly(Ferrocenophane)"**, *Journal of Polymer Science, Polym. Chemistry Edition*, **35**, 3365 (1997).

31) Gyoujin Cho and D. T. Glatzhofer, **"Investigation of Solubilization Behavior for M-Chlorophenol by Polymeric and Copolymeric Surfactants in the Aqueous Phase"**, the *Journal of Industrial and Engineering Chemistry (Seoul)*, **3**, 29-36 (1997).

30) D. T. Glatzhofer, S. Deshpande, G. P. Funkhouser, and C. J. Neef, **"Conducting Polymers (Non-conjugated)"**, *The Polymeric Materials Encyclopedia: Synthesis, Properties, and Applications",* Vol. 2, J. C. Salamone, Ed., Boca Raton: CRC Press, 1439 - 1446 (1996).

29) S. V. Deshpande and D. T. Glatzhofer, **"Synthesis of Cyclophane Diene Monomers for Cyclopolymerization: Electronic Properties of a Polymer with Pendant [3.2]Naphthalenophane Units"**, *Polymer Preprints*, 36 (2), 134 (1995).

28) G. P. Funkhouser, M. P. Arévalo, D. T. Glatzhofer, and E. A. O'Rear, **"Solubilization and Adsolubilization of Pyrrole by Sodium Dodecyl Sulfate: Polypyrrole Formation on Alumina Surfaces"**, *Langmuir*, 11, 1443 (1995).

27) D. J. Guerrero and D. T. Glatzhofer, **"Ring Opening Polymerization of [2.2]Cyclophanes Promoted by Iodine"**, the *Journal of Polymer Science, Polym. Chemistry Edition,* **32**, 979 (1994).

26) D. Guerrero and D. Glatzhofer, **"Synthesis and Electronic Properties of Poly((*E*,*E*)-[6.2](2,5)thiophenophane-1,5-diene)",** the *Journal of Polymer Science, Chemistry Edition*, **32**, 457 (1994).

25) D. T. Glatzhofer, Y. Liang, Gary P. Funkhouser and M. Khan, **"Reactions of Polycyclic Arene Systems Stabilized or Activated by Coordination to Cyclopentadienylruthenium Cations"**, *Organometallics*, **13**, 315 (1994).

24) D. T. Glatzhofer and M. Khan, **"N,N',N"-Triphenyl-1,3,5-triaminobenzene and its σ-complex on protonation: A Stable N,N',N"-Triphenyl-2,4,6-triaminocyclohexadienylium Cation"**, *Acta Crystallographica* C**49**, 2128 (1993).

23) D. T. Glatzhofer, G. Cho, C. L. Lai, E. A. O'Rear and B. M. Fung, **"Polymerization and Copolymerization of Sodium 10-Undecen-1-ylsulfate in Micelles and in Admicelles on the Surface of Alumina"**, *Langmuir*, 9, 2949 (1993).

22) D. T. Glatzhofer, Y. Liang and M. Khan, **"Photodimerization of (η^5-Cyclopentadienyl)(η^6-dibenzo-*p*-quinodimethane)ruthenium Hexafluoro-phosphate"**, *Journal of the Chemical Society, Chemical Communications,* 742 (1993).

21) D. T. Glatzhofer, Y. Liang, and M. A. Khan, **"Formation, Structure, and Reactivity of Dibenzo-*p*-quinodimethane Stabilized as η^6-Ligands of (Cyclopentadienyl)- and (Pentamethylcyclopentadienyl)ruthenium Cations"**,*Organometallics*, 12, 624 (1993).

20) D. T. Glatzhofer, D. J. Guerrero and M. A. Khan, **"Synthesis and Structure of (*E,E*)[6.2]-(2,5)Thiophenophane-1,5-diene: A New Monomer for Cyclopolymerization"**, *Tetrahedron Lett.*, 33, 2633 (1992).

19) J. Ulanski, J. Kubacki, I. Glowacki, M. Kryszewski and D. T. Glatzhofer, **"Photoconductivity of Poly((E,E)-[6.2]Paracylophane-1,5-diene) and Its Complex with TCNE"**, *J. Appl. Polymer Sci.*, 44, 2103 (1992).

18) D. T. Glatzhofer and D. J. Guerrero, **"Electronic Conductivity of Polymers Containing Pendant Cyclophane Rings"**, *Polymer Preprints*, 33, 1170 (1992).

17) D. T. Glatzhofer, Y. Liang, M. A. Khan and P. J. Fagan, **"Stabilization of Dibenzo-*p*-quinodimethane by (Pentamethylcyclopentadienyl)ruthenium Cation"**, *Organometallics.*, 10, 833 (1991).

16) D. T. Glatzhofer, D. Allen and R. Taylor, **"Protonation of N,N',N"-Triphenyl-1,3,5-triaminobenzenes: Stable Aromatic σ-Complexes"**, *J. Org. Chem.*, 55, 6229 (1990).

15) J. Ulanski, J. Sielski, D. T. Glatzhofer and M. Kryszewski, **"Poly(paracyclophane) - High-Mobility Photoconducting Polymer"**, *J. Phys. D.*, 23, 75 (1990).

14) J. S. Miller, D. T. Glatzhofer, R. Laversanne, S. R. Chittappeddi, P. Vaca, T. B. Brill, M. Timken, C. J. O'Conner, J. H. Zhang, J. C. Calabrese and A. J. Epstein, **"Structural and Magnetic Characterization of α- and β-4,4'-(Butadiyne-1,4-diyl)-bis(2,2,6,6-tetramethyl-4-hydroxypiperidin-1-oxyl) and Its Thermal Degradation Product**, *Chem. Mater.*, 2, 60 (1990).

13) J. S. Miller, D. T. Glatzhofer, D. M. O'Hare, W. M. Reiff, A. Chackraborty, and A. J. Epstein, **"Ferromagnetic Behavior in Linear Charge Transfer Complexes. Structural and Magnetic Characterization Of Octamethylferrocene Salts: $[Fe(\eta 5\text{-}C_5Me_4H)_2]^{\cdot +}[A]^{\cdot -}$ (A = TCNE, TCNQ)",** *Inorg. Chem.,* 28, 2930 (1989).

12) I. Glowacki, J. Kubacki, J. Ulanski, D. T. Glatzhofer and M. Kryszewski, **"A New Photoconducting Polymer - Poly(paracyclophane)"**, *Potsdamer Forshungen - Wissenschaftliche Zeitshrift der Pädagogische Hochschule"Liselotte Herrmann", Güstrow, DDR*, 26, 219 (1988).

11) R. Laversanne, A. Chakraborty, D. T. Glatzhofer, A. J. Epstein and J. S. Miller, **"Search for New Molecular Ferromagnets: EPR and Magnetic Studies of Charge Transfer Salts"**, *Synth. Met.*, 27, B353 (1988).

10) J. S. Miller, J. C. Calabrese, D. T. Glatzhofer and A. J. Epstein, **"The quest for a polymeric ferromagnet: A new polymorph of 1,4-bis(2,2,6,6-tetramethyl-4-oxy-4-piperidyl-1-oxy)butadiyne"**, *J. Appl. Phys.*, 63, 2949 (1988).

9) J. S. Miller, D. T. Glatzhofer, J. C. Calabrese and A. J. Epstein, **"A New Polymorph of 4,4'-(Butadiyne-1,4-diyl)-bis-(2,2,6,6-tetramethyl-4-hydroxypiperidin-1-oxyl)**, *J. Chem. Soc., Chem. Comm.*, 322 (1988).

8) J. Ulanski, D. T. Glatzhofer, M. Przybylski, F. Kremer, A. Gleitz and G. Wegner, **"Frequency/Temperature Response of Conductivity in Poly(*p*-styrenesulphonate) Salts of Polypyrrole"**, *Polymer*, 28, 859 (1987).

7) D. T. Glatzhofer, J. Ulanski and G. Wegner, **"Controlled Conductivity Behavior in Poly(*p*-styrenesulphonate) Salts of Polypyrrole"**, *Polymer*, 28, 449 (1987).
6) G. Wegner, W. Wernet, D. T. Glatzhofer, J. Ulanski, C. Kröhnke and M. Mohammadi, **"Chemistry and Conductivity of Some Salts of Polypyrrole"**, *Synth. Met.*, 18, 1 (1987).

5) D. T. Glatzhofer and D. T. Longone, **"4,14-Divinyl-(E,E)-[4.4]Paracyclophane-1,11-diene. An Unusual Product from a 1,10-Hofmann Elimination"**, *Tetrahedron Lett.*, 27, 5923 (1986).

4) J. Ulanski, D. T. Glatzhofer and G. Wegner, **"Comment on the Application of the Voltage Shorted Technique to Conducting Polymers"**, *Makromol. Chem., Rapid. Comm.*, 7, 361 (1986).

3) D. T. Glatzhofer and D. T. Longone, **"Extended Electronic Cooperative Effects in Poly((E,E)-[6.2]Paracylophane-1,5-diene)"**, *J. Polym. Sci., Polym. Chem. Ed.*, 24, 947 (1986).

2) D. T. Longone and D. T. Glatzhofer, **"Cyclopolymerization of (E,E)-[6.2]Paracyclophane-1,5-diene"**, *J. Polym. Sci., Polym. Chem. Ed.*, 24, 1725 (1986).

1) D. T. Glatzhofer and D. T. Longone, **"A 1,10-Hofmann Elimination, Synthesis of a [6.6]Paracyclophane Tetraene"**, *Tetrahedron Lett.*, 24, 4413 (1983).